

Investigating Oxygen Producers



Does photosynthesis occur in aquatic organisms? Do they produce oxygen? Let's find out!

First, try to answer these questions below or in science notebooks:

1. What happens to blue water containing bromothymol blue (BTB) solution when we blow into it?
2. What gas do we produce and breathe out? How does a BTB solution change with higher levels of it?
3. What do you know about **photosynthesis**? What substances react together and what products are created? Record your ideas below or in a science notebook with words and pictures.
4. What experiment might you conduct to see if *Elodea* is able to photosynthesize in water?
As you plan your experiment, record your ideas about these parts of every well-designed investigation:

Observe + Explore	What do you observe about the plants and other materials? How could they work together to help us answer the question above?	
Testable Question	What question do you hope to answer with your experiment? For example, does the amount of light in a room affect plant growth?	
Independent Variable	What variable causes the results/outcome of this experiment? (For example, the amount of light in the question above.)	
Experimental (dependent variable) setup	What setup could you use that measures the outcome of the experiment?	
Control setup	What setup could you use that that doesn't include the variable? (For example, not adding extra light or putting a plant in the dark.) The control helps you see if the results were caused by the addition of the experimental (variable) group(s).	

Controls	Parts of an experiment that are the same between conditions: for example, plants growing in the same size pot and the same amount of water added.	
Hypothesis	What do you predict that the experiment will demonstrate?	
Procedure What steps will you take to test your hypothesis and record your results?		
Data Collection	How will you record data in a way that is the most useful? For example, will you use a table, a spreadsheet or something else?	

5. Show your teacher your plan for the experiment and then try it! Use gloves and goggles and be very careful with the BTB solution, which can stain clothes and skin.
6. **Results** of your experiment:
7. **Analysis:** What story does your results tell you? For example, if you observed a color change to a BTB solution, what might that indicate? Can you graph and analyze your data?
8. **Conclusion:** Was your hypothesis correct? Why or why not? Would you get the same results if you repeated the same procedure? What other experiment(s) might you conduct to help you learn more?
9. **Ocean discovery:** Imagine you are a scientist who has discovered that 600 million years ago Earth's atmosphere had less than five percent oxygen (compared with 21% today). The atmosphere was mainly a mix of nitrogen and carbon dioxide. And grasses, shrubs, trees, ferns and mosses would not evolve until millions of years later! What hypothesis would you propose to explain how atmospheric oxygen rose to today's level? What evidence do you have to support your idea?